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## RESEARCH MEMORANDUM

# PERFORMANCE OF NON-PRIOR-SERVICE NAVY RECRUITS: 1978-1986

Aline O. Quester  
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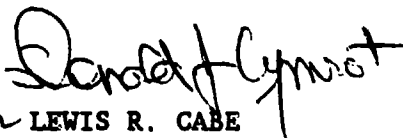
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1. The Center for Naval Analyses (CNA) was asked to examine the relationship between recruit characteristics and recruit success. The results of the analysis are contained in enclosure (1). It is forwarded to you as a matter of possible interest.

2. The study uses five measures of recruit performance and several recruit characteristics obtained from enlistment applications to determine characteristics of recruits who are more likely to be successful. The recruit performance indicators are desertion, demotion, first-term attrition, promotion, and retention beyond the initial obligation.

  
for LEWIS R. CABE  
Director  
Manpower and Training Program

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# **PERFORMANCE OF NON-PRIOR-SERVICE NAVY RECRUITS: 1978-1986**

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# ABSTRACT

This research memorandum describes measures of recruit success in the Navy using five performance indicators: desertion, demotion, first-term attrition, promotion, and retention. The CNA data base used here includes all non-prior-service accessions between FY 1978 and December 1986.



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## INTRODUCTION

As the experience of the Navy with the All-Volunteer Force has increased, so has information on the performance of Naval accessions in both good and bad recruiting climates. This research memorandum uses easily measured recruit characteristics found in the accession data base at the Center for Naval Analyses (CNA) and reviews several indicators of performance for recruits with initial obligations of three and four years. Sections of the work were alternatively requested by the Deputy Chief of Naval Operations (Manpower, Personnel and Training) or by the Deputy Assistant Secretary of the Navy (Manpower). The results of these descriptions of the Navy's recent experience help to identify recruit characteristics associated with successful adaptation to Navy life. The indicators are desertion, demotion, first-term survival, promotion, and retention beyond the initial contract period. *Keywords: ... FLD 18*

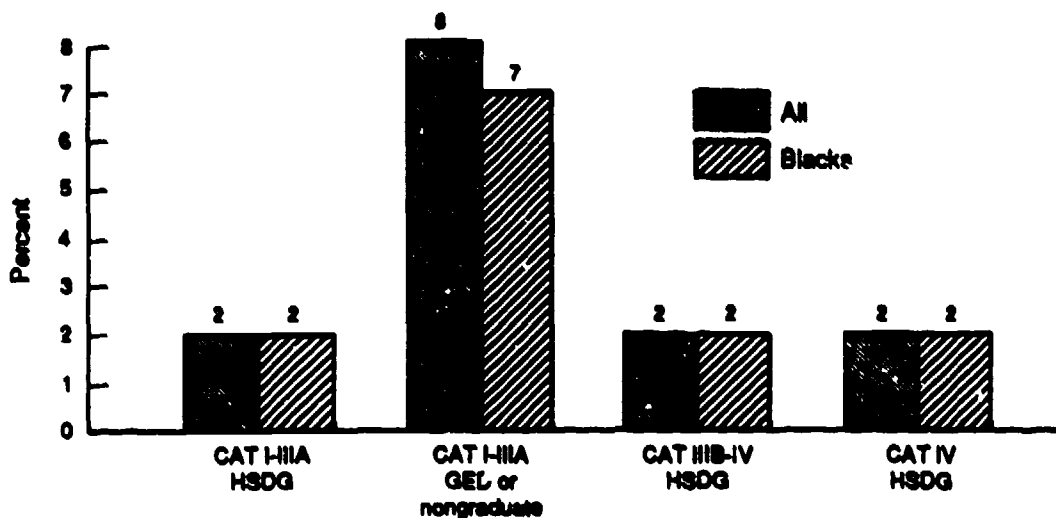
Results show that differences in aptitude, as measured by the Armed Forces Qualification Test (AFQT) score, result in some differences in performance, but the differences are small. On all the indicators, high school diploma graduates (HSDGs) perform better than recruits holding General Education Diplomas (GEDs) or recruits who have not completed high school. Performance differences by education are large, and the pattern of greater HSDG success holds across mental, racial, and ethnic groups and across enlistment program, rating, age, sex, and enlistment year.

## DESERTIONS

Desertions are identified as any unauthorized absence of 31 days or longer and are serious infractions of Navy discipline. The percentage of recruits who desert is quite low, but the high administrative and, sometimes, legal costs make it a valuable indicator of a serious lack of adaptation to Navy life.

Figure 1 shows desertion levels within 24 months for different recruit types in the 1978 to 1984 period. As is strikingly clear, HSDGs desert at low rates: the 2 percent of the HSDGs who test in the top half of the ability distribution (CAT I-III A) and desert look just like the 2 percent HSDGs who test below the top half of the distribution (CAT IIIB, CAT IV) and desert.<sup>1</sup> But among the GEDs and nongraduates, desertions occurred at four times the rates of the graduates.

1. Because the AFQT is nationally normed, these ability distributions reflect population estimates. CAT IV recruits test in the 10th to 30th percentile of the AFQT, but the Navy primarily accesses recruits who score in the upper proportions of the CAT IV range; by law, the services cannot access recruits with AFQT scores below the 10th percentile.



Source: CNA. Non-prior-service 3-YO and 4-YO accessions for the fiscal 1978 through late fiscal 1984 time period (397,827 accessions).

**FIG. 1: PERCENT OF NON-PRIOR-SERVICE RECRUITS WHO DESERT WITHIN THE FIRST 24 MONTHS**

There were some differences in desertion rates by accession program, but these differences were small relative to the differences by educational background. Within the largest accession programs, four-year obligors who are school guarantees (SG) and general detail (GENDET) recruits, desertion rates were slightly higher among GENDETs.<sup>1</sup> Among both SGs and GENDETs, recruits who were not diploma graduates were consistently more likely to desert. After 24 months, differences mirrored those in figure 1 for all three- and four-year first-term obligors: the proportion of recruits in these programs with no diplomas or with GEDs who had deserted was about four times that of the HSDG proportion in both programs. Among the non-diploma-graduate recruits, those who had not completed high school were slightly more likely to have deserted than were those with GEDs.<sup>2</sup>

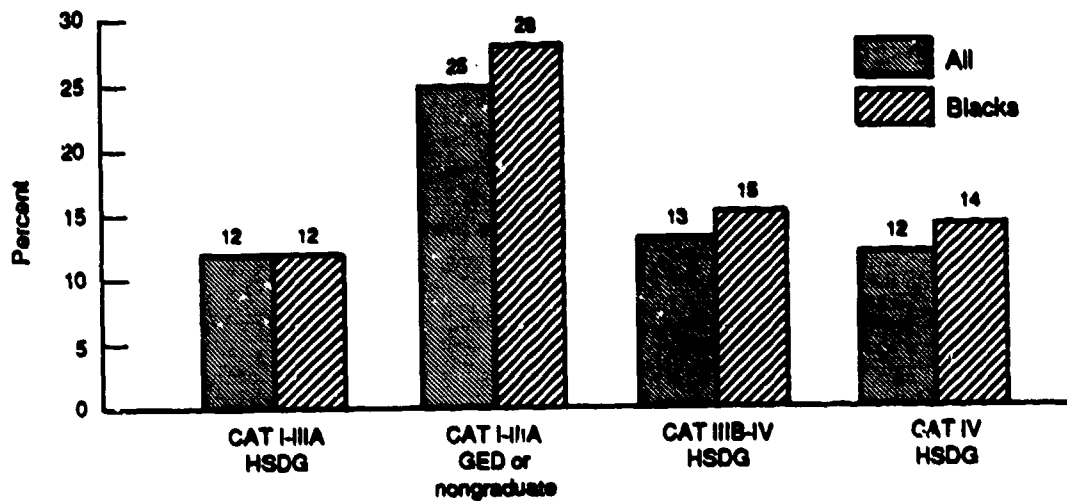
#### **DEMOTIONS BY 30 MONTHS**

Although some demotions are essentially permanent ones, many are of extremely short durations, so demotion rates may vary in their meaning. Taken together, however, systematic differences in demotion rates are another indicator of performance.

1. GENDET recruits are not promised schooling, but many later are sent to school or become rated on the job.

2. Tables in the appendix provide the basic data used to construct the figures in this research memorandum. Although the tables do not include detail for subgroups, tabular data may be requested from the authors.

Again, recruit performance is better among HSDGs. As seen in figure 2, about half as many HSDGs as non-HSDGs had been demoted in the first 30 months of service. Even when the comparison is between CAT I-III A recruits without diplomas and CAT IV recruits with diplomas, the nongraduates have been twice as likely to have been demoted.



Source: CNA. Non-prior-service 3-YO and 4-YO accessions in the fiscal 1978 through early fiscal 1985 time period (369,530 accessions).

**FIG. 2: PERCENT OF NON-PRIOR-SERVICE RECRUITS DEMOTED WITHIN THE FIRST 30 MONTHS**

The figure also shows that except for CAT I-III A/HSDGs, black recruits are somewhat more frequently demoted than all recruits. This is the only indicator examined for which black performance is not the same as, or better than, the average for all recruits.

Data not displayed show some differences by accession type: after 30 months of service, 15 percent of SG recruits and 19 percent of GENDET recruits had been demoted. (Only 1 percent of each group were demoted more than once.) Most of these differences in demotion propensities can be explained by differences in the educational and AFQT category distributions of SG and GENDET recruits. For example, looking within educational and AFQT categories, differences in demotion rates between SG and GENDET recruits are quite small. For CAT III B/IV recruits, 12 percent of SG HSDGs and 14 percent of GENDET HSDGs were demoted. For the non-HSDG recruits, the demotion rates were 20 percent for SG recruits and 21 percent for GENDET recruits. Differences by educational background

are much larger than differences by AFQT category. Although the educational background differences resulted in 7- to 8-percentage point differences in demotion rates within the accession and AFQT categorizations above, differences by AFQT category are modest: for example, for GENDET HSDGs, 13 percent of the CAT I-IIIA and 14 percent of the CAT IIIB/IV recruits were demoted by 30 months.

#### ATTRITION RATES

Substantial proportions of recruits in all military services do not complete their initial service obligation. Table 1 shows first-term attrition rates, by HSDG and non-HSDG status, for recruits in each of the four services. In each service, fewer than half of non-HSDG recruits complete their initial obligation. Attrition rates for HSDGs are much lower, with the Navy having the lowest first-term attrition rates in each educational category. Figure 3 shows Navy 30-month attrition rates in more detail for non-prior-service three- and four-year obligors (3-YO, 4-YO) from FY 1978 to late FY 1984. In all, there were 369,530 recruits that could be observed for 30 months. The figure shows attrition by education and AFQT category for all recruits and for black recruits. Clearly, CAT I-IIIA recruits without diplomas stand out again as the group least likely to perform well; in this case, 42 percent had left the Navy by 30 months. Among recruits with HSDGs, the attrition rate was 21 to 26 percent.

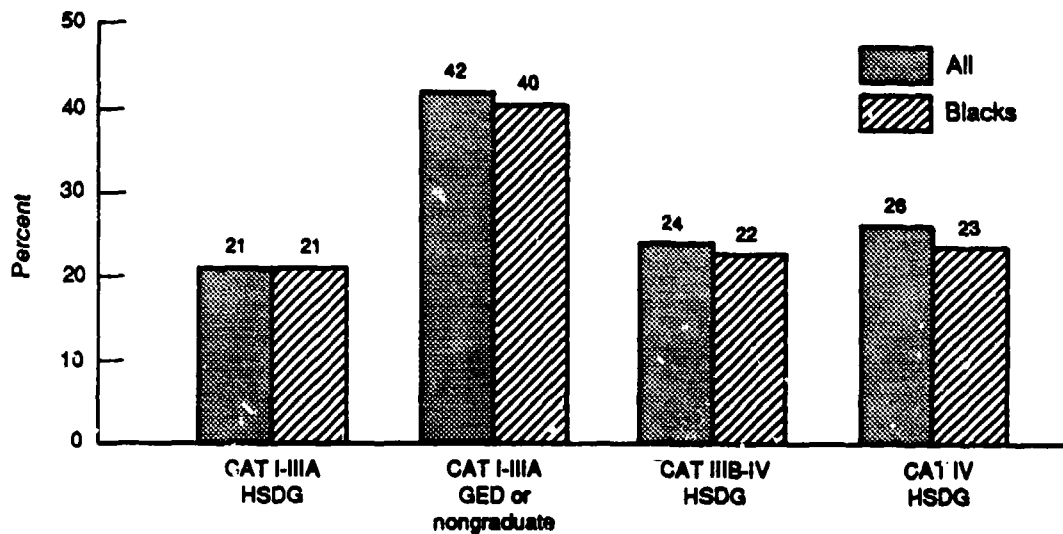
**TABLE 1**  
**FIRST-TERM ATTRITION RATES**  
**(1980-1982 accessions)**

	<u>HSDG</u>	<u>Non-HSDG</u>	<u>Overall</u>
Army	32.5	54.5	38.7
Air Force	32.0	57.3	34.6
Marine Corps	33.9	58.6	38.6
Navy	28.5	53.4	34.4

SOURCE: Defense Manpower Data Center.

#### Attrition by Accession Program

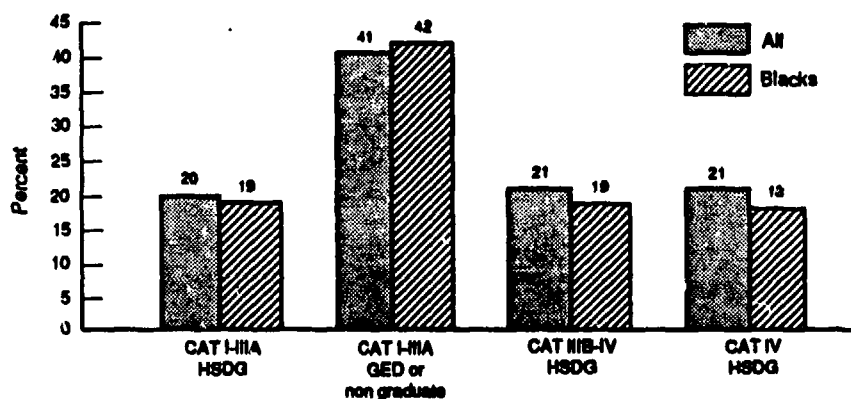
Attrition rates by accession program can be calculated for any Navy program, but only the results for the two largest recruit programs are discussed here. Both have four-year initial obligations. Among SG enlistees, 23 percent had attrited by 30 months and 31 percent by 45 months. There was little difference (1 percentage point) in attrition rates by AFQT categories. Black SG recruits were slightly less likely to leave than all SGs, but the differences are small (2 to 3 percentage points).



Source: CNA. Non-prior-service 3-YO and 4-YO accessions for the fiscal 1978 through the late fiscal 1984 time period (369,530 accessions).

**FIG. 3: NON-PRIOR-SERVICE ACCESSIONS:  
30-MONTH ATTRITION RATES**

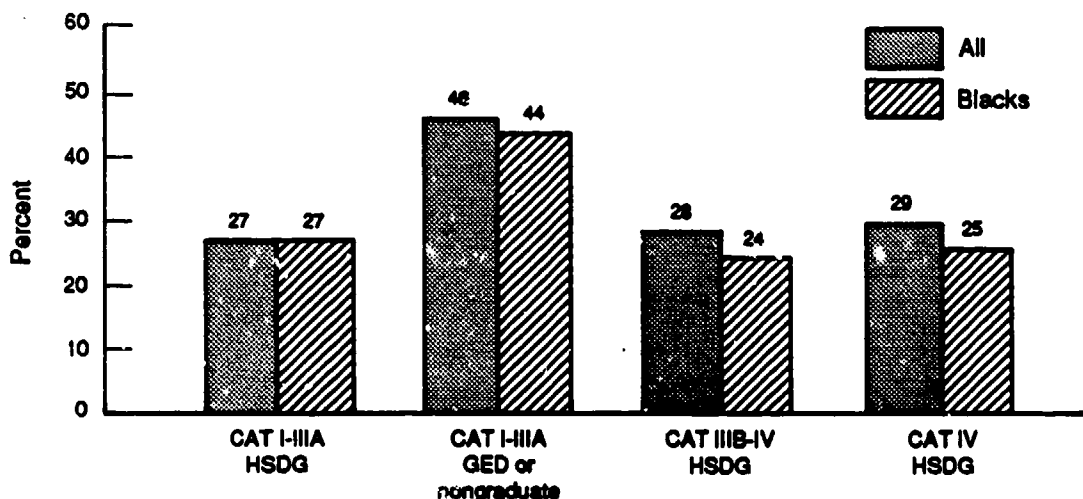
Differences by education again leap out of the attrition patterns. As figure 4 shows, 41 percent of non-HSDG recruits had left by 30 months compared to only 20 to 21 percent of HSDG SG recruits. After 45 months, the figures were 52 percent and 27 percent, respectively.



Sources: CNA. Non-prior-service 4-YO school guarantee accessions from fiscal 1978 through early fiscal 1985 (158,681 accessions).

**FIG. 4: 4-YO A-SCHOOL GUARANTEE ACCESSIONS:  
30-MONTH ATTRITION RATES**

GENDET recruits with four-year obligations were more likely to attrite and generally less likely to complete their initial obligation than were SG accessions (see figure 5 in comparison to figure 4). This overall pattern holds among subgroups defined by education, AFQT category, and race; the differences are generally in the 5- to 7-percentage-point range after 30 months and the 6- to 8-point range after 45 months (45-month attrition rates are not shown).



Source: CNA. Non-prior-service 4-YO GENDET accessions from fiscal 1978 through early fiscal 1985 (114,844 accessions).

**FIG. 5: 4-YO GENDET ACCESSIONS:  
30-MONTH ATTRITION RATES BY RECRUIT CHARACTERISTICS**

#### Attrition by Rating

Attrition by rating was also explored for SG recruits with initial obligations of four years. In this context, it is easier to focus on the percentage of recruits surviving and occupationally qualified in the rating guaranteed upon enlistment. For example, at 45 months of active duty, the percentages of SG machinist mate (MM) enlistees surviving and rated as MMs are:

- 57 percent of CAT I-III A HSDG enlistees
- 55 percent of CAT III B HSDG enlistees
- 51 percent of CAT IV HSDG enlistees
- 28 percent of CAT I-III A nongraduate and GED enlistees.

The pattern among MM recruits is not unique, although the magnitude of differences between educational groups varies by rating. Other examples at the 30-month point are shown in table 2.

TABLE 2

**SCHOOL GUARANTEE RECRUITS:  
NUMBER AND PERCENT RATED IN RATING OF GUARANTEE AT 30 MONTHS<sup>a</sup>**

<u>Rating</u>	<u>CAT I-III A HSDG</u>	<u>CAT I-III A Non-HSDG</u>	<u>CAT IIIB HSDG</u>	<u>CAT IV HSDG</u>
BT	4,979 (66)	1,691 (42)	1,496 (63)	1,231 (53)
MM	8,809 (66)	1,457 (40)	1,872 (64)	1,501 (58)
EN	2,639 (64)	724 (45)	1,579 (68)	1,081 (62)
HM	16,109 (56)	2,711 (33)	4,875 (55)	1,705 (45)
AZ	1,247 (66)	274 (43)	154 (61)	-- <sup>b</sup>
DT	1,745 (40)	228 (22)	796 (31)	168 (19)
EW	2,080 (71)	424 (48)	86 (63)	-- <sup>b</sup>
OS	7,298 (71)	2,470 (50)	491 (69)	62 (56)
RM	7,424 (64)	1,441 (42)	4,460 (64)	2,248 (62)

a. Number accessed FY 1978 through early FY 1984, with percent survived and rated in parentheses.

b. Insufficient recruits for meaningful statistic.



## EARLY PROMOTIONS

A more positive performance indicator than those previously discussed is promotion.<sup>1</sup> Among all non-prior-service (NPS) recruits, early promotion patterns show HSDGs are about twice as likely as non-HSDGs to have been promoted.<sup>2</sup> For example:

	<u>All recruits</u>	<u>HSDG</u>	<u>GED or nongraduate</u>
Percent of NPS recruits promoted to:			
E3 or above by 12 months <sup>a</sup>	36%	40%	19%
E4 or above by 45 months <sup>b</sup>	45%	52%	27%

a. NPS accessions from FY 1978 through December 1985.

b. NPS accessions from FY 1978 through March 1983.

## School Guarantee Recruits

Looking at the largest recruit program, SG, after 12 months in service, 42 percent of SG recruits had been promoted to E3 or above; after 45 months, 60 percent had attained E4 or above. As seen in table 3, however, differences in the percentage who received such promotions varied more by educational background than by AFQT category. When the two recruit characteristics are combined, the data show that HSDG accessions who test in the top half of the AFQT distribution were most frequently promoted (49 percent by 12 months), but only 25 percent of non-HSDG accessions with similar AFQT test scores had been promoted. Indeed, HSDGs in the lowest AFQT category, with 39 percent receiving promotions by 12 months, were considerably more successful than CAT I-III non-HSDGs.

1. As table A-1 in the appendix shows, the number of people who can be observed for 12 months is larger than the number who can be observed for 45 months. In particular, the early years of the sample are more heavily represented in the 45-month promotion rates. Thus, the 45-month promotion rate for all recruits weights GED or nongraduates more heavily since the proportion of non-HSDGs was higher in these years.

2. Because the emphasis of this work was on the performance of accessions, all promotion rates are derived from the accession base. Thus, for example, to be promoted to E4 by 45 months, a recruit has to both survive to 45 months and be promoted to petty officer status (E4).

TABLE 3

**PERCENT PROMOTED AMONG SG RECRUITS WITHIN  
12 AND 24 MONTHS BY RECRUIT CHARACTERISTICS**

	<u>Percent of accessions receiving promotions</u>	
	<u>E3 or above by 12 months<sup>a</sup></u>	<u>E4 or above by 45 months<sup>b</sup></u>
Total SG recruits	42	60
AFQT category		
CAT I-III A	45	61
CAT III B/IV	37	57
Education		
HSDG	46	65
GED	27	39
Nongraduate	21	35
AFQT category and education		
CAT I-III A HSDG	49	67
CAT I-III A non-HSDG	25	38
CAT III B/IV HSDG	39	62
CAT III B/IV non-HSDG	21	34

a. NPS accessions from FY 1978 through December 1985.

b. NPS accessions from FY 1978 through March 1983.

#### **GENDET Recruits**

GENDET accessions with high school diplomas were twice as likely to be promoted to E3 or above by 12 months as were other GENDET accessions (36 percent and 17 percent, respectively). After 24 months, 70 percent of HSDGs were E3s compared to 45 percent of GEDs and non-HSDGs.

Table 4 provides a closer look at four-year GENDET recruit promotion patterns. As seen in the right-most column, accessions in the upper AFQT categories are somewhat more likely to receive very early promotion (after 12 months) than are those in the lower categories, but these differences disappear after 24 months. The most pronounced differences are between HSDGs and others, as seen in the first two columns: overall, and controlling for AFQT category and race, diploma graduates were more than twice as likely to have been promoted to E3 by 12 months and half again more likely to attain an E3 or above by 24 months than were other four-year GENDET obligators.

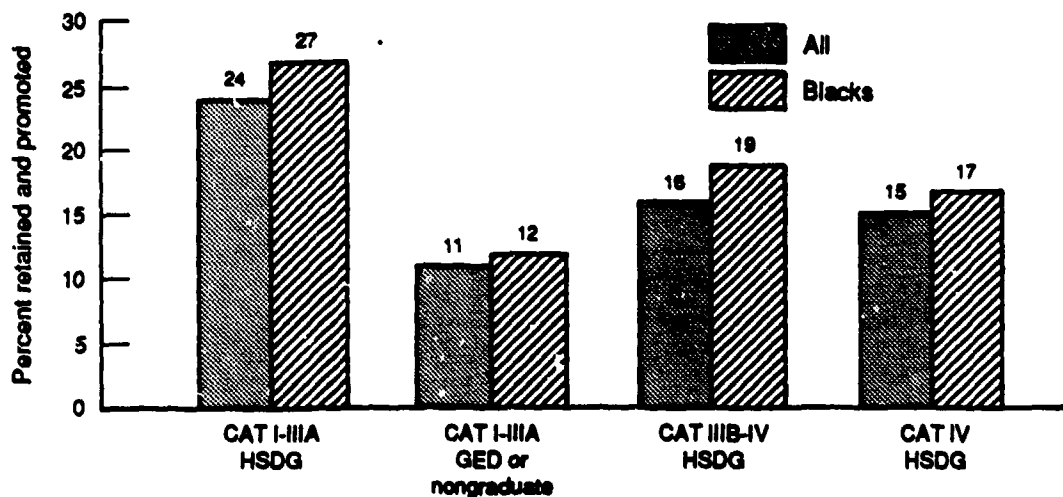
TABLE 4

**PERCENT OF FOUR-YEAR GENDET RECRUITS  
RECEIVING PROMOTIONS BY MENTAL GROUP,  
RACE, AND EDUCATIONAL BACKGROUND,  
1978-1984/1985**

Percent of accessions receiving promotion			
	<u>HSDG</u>	<u>Non-HSDG</u>	<u>Total</u>
E3 or above by 12 months			
Total	34	15	30
AFQT CAT I-III A	42	17	33
AFQT CAT IIIB/IV	29	12	27
Blacks			
AFQT CAT I-III A	46	17	39
AFQT CAT IIIB/IV	34	16	33
E3 or above by 24 months			
Total	68	43	62
AFQT CAT I-III A	72	44	62
AFQT CAT IIIB/IV	66	40	62
Blacks			
AFQT CAT I-III A	71	44	65
AFQT CAT IIIB/IV	70	47	69

**PROMOTION AND RETENTION**

A still more positive quality indicator is the percentage of accessions who have been both promoted and retained beyond their initial service commitment. The proportion of 3-YOs and 4-YOs who were retained and promoted to E5 by 60 months is shown in figure 6. Again, the GEDs and nongraduates are least likely to do well, and the differences are not trivial. Among upper AFQT category recruits, non-HSDGs are about half as likely as HSDG recruits to still be in the Navy and have attained the rank of E5 by 60 months. Moreover, the pattern is consistent among all recruits and among race and ethnic subgroups. Indeed, recruits testing in AFQT categories IIIB and IV were more likely to have been retained and promoted to E5s than CAT I-III A GEDs and nongraduates.



Source: CNA. Non-prior-service 3-YO and 4-YO accessions for fiscal 1978 through the early 1982 time period (232,151 recruits).

**FIG. 6: RETAINED AND PROMOTED TO E5 BY 60 MONTHS**

## SUMMARY

Each recruit performance indicator discussed here provided somewhat different information, but every result shows that differences in educational background swamp all others in explaining recruit adaptability to military life. In terms of performance in the Navy, a GED is not equivalent to a high school diploma. The pattern over the recent past is consistent overall, and it is consistent over subgroups, over time, across accession types, and across ratings. Moreover, the differences in performance are large.

Survival rates, for example, show that diploma graduates are more likely to finish what they start. This may not be surprising: GEDs and non-HSDGs did not complete regular high school, and they have been least likely to complete their commitments to the Navy. The more positive promotion indicators show a reinforcing pattern: not only are diploma graduates less likely to leave, they are more likely to do well. Even among the smaller proportion of GEDs and non-HSDGs who remain until the end of their initial enlistment, fewer show the above-average performance necessary for promotion, and fewer are retained or extended.

On most indicators, upper AFQT category recruits holding HSDGs perform better than recruits in any other combination of AFQT category and education, but these young men and women are also the most costly for the Navy to recruit. There are tradeoffs between the costs of recruiting and the quality of the recruits, and the declining number of young people of recruitment age is likely to increase the challenge faced by the Navy (and by all the services) of maintaining a quality force. Every indicator of recent non-prior-service recruit performance examined here shows that those who finish what they are supposed to finish--the diploma graduates--adjust better to Navy life and are more likely to succeed in it.

**APPENDIX**  
**DATA TABLES**

**APPENDIX**  
**DATA TABLES**

Tables in this appendix provide basic data for desertions, demotions, promotions, and survival. Table A-1 looks at these performance indicators for non-prior-service recruits with initial obligations of three or four years by educational background; table A-2 examines these same recruit performance indicators, but restricts the analysis to those recruits that test in the top half of the ability distribution (AFQT CAT I-III A).

All information is derived from the Enlisted Master Records and the sample is the universe of enlisted personnel with three- and four-year obligations who accessed in the FY 1978 to FY 1986 time period. Tracking information exists through the end of FY 1986. All recruits who accessed from FY 1978 through the first half of FY 1986 can be observed for six months, but information on behavior over a 45-month period is available only for recruits accessed from FY 1978 through FY 1983.

TABLE A-1

**PERFORMANCE OF NON-PRIOR-SERVICE ACCESSIONS  
WITH INITIAL OBLIGATIONS OF THREE OR FOUR YEARS:  
BY EDUCATION**

	HSDG		GED/nongraduate		Total	
<b>Desertions</b>						
By 6 months	534	386,122	0.00	654	101,347	0.01
By 24 months	6,141	312,405	0.02	6,755	85,422	0.08
By 45 months	9,470	224,352	0.04	9,814	78,527	0.12
					1,188	487,469
					12,896	397,827
					19,284	302,879
						0.00
						0.03
						0.06
<b>Demotions by 30 months</b>						
E2 to E1	19,063	286,665	0.07	13,200	82,865	0.16
E3 to E2	14,967	286,665	0.05	5,744	82,865	0.07
Other	4,590	286,665	0.02	1,897	82,865	0.02
Multiple demotions	3,464	286,665	0.01	1,785	82,865	0.02
					5,249	369,530
					32,263	369,530
					20,711	369,530
					6,487	369,530
					5,249	369,530
						0.09
						0.06
						0.02
						0.01
<b>Promotions</b>						
E3 or above by 12 months	146,140	363,776	0.40	17,946	94,853	0.19
E3 or above by 24 months	230,769	312,405	0.74	40,829	85,422	0.48
E4 or above by 32 months	125,382	276,965	0.45	18,860	81,773	0.23
E4 or above by 45 months	115,740	224,352	0.52	21,074	78,527	0.27
E5 or above by 60 months	33,719	167,979	0.20	6,138	64,172	0.10
					39,857	232,151
					164,086	458,629
					271,598	397,827
					144,242	358,738
					136,814	302,879
						0.45
						0.17
<b>Survival</b>						
Surviving 30 months	221,672	286,665	0.77	47,598	82,865	0.57
Surviving 45 months	137,129	224,352	0.61	29,004	78,527	0.37
					269,270	369,530
					166,133	302,879
						0.73
						0.55

**NOTE:** The first column under each education heading is the number of accessions in the 1978 to 1986 time period described by the category (desertion, demotion, promotion, survival). The second column is the number of accessions that can be observed for the number of months specified, for example, 6, 24, or 45 months for desertions. (While all accessions from the 1978 to June 1986 time period can be observed for 6 months, only accessions from 1978 through March 1983 can be observed for 45 months.) The final column is the ratio of the first column to the second.



TABLE A-2

**PERFORMANCE OF NON-PRIOR-SERVICE AFQT CAT I-III A ACCESSIONS  
WITH INITIAL OBLIGATIONS OF THREE OR FOUR YEARS:  
BY EDUCATION**

	HSIG		GED/nongraduate	
<b>Desertions</b>				
By 6 months	272	195,658	0.00	0.01
By 24 months	2,907	161,642	0.02	0.08
By 45 months	4,400	111,761	0.04	0.13
<b>Demotions by 30 months</b>				
E2 to E1	8,694	148,631	0.06	0.16
E3 to E2	7,517	148,631	0.05	0.07
Other	2,708	148,631	0.02	0.03
Multiple demotions	1,815	148,631	0.01	0.02
<b>Promotions</b>				
E3 or above by 12 months	86,781	185,695	0.47	0.21
E3 or above by 24 months	124,915	161,642	0.77	0.49
E4 or above by 36 months	76,760	132,610	0.58	0.29
E4 or above by 45 months	62,713	111,761	0.56	0.28
<b>Survival</b>				
Surviving 30 months	117,538	148,631	0.79	0.58
Surviving 45 months	70,706	111,761	0.63	0.38

**NOTE:** The first column under each education heading is the number of accessions in the 1978 to 1986 time period described by the category (desertion, demotion, promotion, survival). The second column is the number of accessions that can be observed for the number of months specified, for example, 6, 24, or 45 months for desertions. (While all accessions from the 1978 to June 1986 time period can be observed for 6 months, only accessions from 1978 through March 1983 can be observed for 45 months.) The final column is the ratio of the first column to the second.